Purpose

Function ESP (Extended Streamflow Prediction) is a forecast Function that creates long-term probabilistic forecasts of flow volumes, peak flows, minimum flows, reservoir stages, flow durations, etc., using the current watershed conditions with historical time series data such as MAP, MAT, MAPE and STG.

Function ESP uses the Operations Table concept developed for the Calibration and Operational Forecast systems. The Segments defined for Function ESP must correspond with those defined for Function FCEXEC since Function ESP obtains the order of Segment execution, the list of Operations for each Segment and the parameters for each Operation from the Forecast Component files maintained by the Forecast Component Initialization Program (FCINIT - see Section VI.3.4 [Hyperlink]).

The current watershed conditions are obtained from the carryover files which are updated by Function FCEXEC.

Historical time series external location information and ESP analysis information are obtained from the ESP parameter file maintained by the Extended Streamflow Prediction Initialization Program (ESPINIT - see Section VI.3.5 [Hyperlink]).

HCL Input

Input to Function ESP is through the Hydrologic Command Language (HCL).

The input consists of Techniques and their Arguments (see Section VI.5.3C-ESP-TECH [Hyperlink]).

Sample HCL Input

The following example will run the Segment GSPRGRF. Local default for the start of the run and the start and end of the windows Techniques have been set. Historical water years 1951 through 1976 will be used for the analysis.

Example 1. One Segment

```
@SETOPTIONS
 ONESEG GSPRGRF
 HISTWYRS 1951 1976
@COMPUTE ESP
@STOP
```

Example 2. Forecast Group with Options

The following example will run the Forecast Group GREENMTN. Historical water years 1960 through 1979 will be used for the analysis. The run will begin on 2/1/82 and the analysis will be performed on two windows: 2/1/82 to 2/28/82 and 4/1/82 to 6/30/82. The historical simulation will be performed. Frequency plots will not be produced.

```
   @SETOPTIONS
    FGROUP GREENMTN
    HISTWYRS 1960 1979
    STARTESP 020182
    WINDOWS(2) 020182 022882 040182 063082
    HISTSIM
    FREQPLOT(0)
   @COMPUTE ESP
   @STOP
```

Example 3. Multiple Computes

The following example shows how multiple computes can be used allowing options
to be changed between computes. For the second compute the FGROUP Technique
was turned off, the ONESEG Technique was turned on, the historical water years
were changed and the windows were changed.

```
   @SETOPTIONS
    FGROUP GREENMTN
    HISTWYRS 1960 1979
    WINDOWS(2) 0210182 022882 040182 063082
   @COMPUTE ESP
   @SETOPTIONS
    FGROUP(0)
    ONESEG GSPRGRF
    HISTWYRS 1951 1976
    WINDOWS(1) 040182 093082
   @COMPUTE ESP
   @STOP
```

<u>Output</u>

Function ESP produces printer output and writes time series data to ESP time
series data files.

<u>Error Messages</u>

Error messages printed by Function ESP are described in Section VI.5.3C-ESP-
ERROR [Hyperlink].

Other errors may be printed by other parts of the Forecast Program (see
Section VI.5.3C-FCEXEC-ERROR [Hyperlink]) and by Operations (see Section V.3.3
[Hyperlink]).